

WEST Search History

DATE: Wednesday, August 27, 2003

<u>Set Name</u>	<u>Query</u>	<u>Hit Count</u>	<u>Set Name</u>
side by side			result set
<i>DB=USPT,PGPB,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=OR</i>			
L12	l5 and l8 and L11 and (urethane or polyurethane)	3	L12
L11	water	2904347	L11
L10	water and L9	1	L10
L9	l7 and L8	1	L9
L8	low adj (resiliency or resilience)	719	L8
L7	l2 and (urethane or polyurethane)	78	L7
L6	(aliphatic adj polymer)same(primary adj hydroxyl)	1	L6
L5	(chlorinated or halogenated)adj paraffin	6989	L5
L4	6395796	2	L4
L3	cereclor adj2 56	2	L3
L2	cereclor	176	L2
L1	klp adj2 1203	2	L1

END OF SEARCH HISTORY

WEST[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 3 of 3 returned.**☐ 1. Document ID: US 4987156 A

L12: Entry 1 of 3

File: USPT

Jan 22, 1991

US-PAT-NO: 4987156

DOCUMENT-IDENTIFIER: US 4987156 A

TITLE: Shock-absorbing polyurethane foam and production process thereof

Full	Title	Citation	Front	Reviewer	Classification	Date	Reference	Sequences	Attachments	Claims	KBAC	Draw Desc	Image
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☐ 2. Document ID: US 4698369 A

L12: Entry 2 of 3

File: USPT

Oct 6, 1987

US-PAT-NO: 4698369

DOCUMENT-IDENTIFIER: US 4698369 A

TITLE: Flexible, flame-retardant polyurethane foams

Full	Title	Citation	Front	Reviewer	Classification	Date	Reference	Sequences	Attachments	Claims	KBAC	Draw Desc	Image
------	-------	----------	-------	----------	----------------	------	-----------	-----------	-------------	--------	------	-----------	-------

☐ 3. Document ID: WO 200238656 A2 AU 200214885 A

L12: Entry 3 of 3

File: DWPI

May 16, 2002

DERWENT-ACC-NO: 2002-575202

DERWENT-WEEK: 200261

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TITLE: Flexible isocyanate-based polymeric foam for use in vehicular applications, has low resiliency, preset glass transition temperature and preset change in tan delta from median value measured at preset temperature

Full	Title	Citation	Front	Reviewer	Classification	Date	Reference	Sequences	Attachments	Claims	KBAC	Draw Desc	Clip Img	Image
------	-------	----------	-------	----------	----------------	------	-----------	-----------	-------------	--------	------	-----------	----------	-------

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Terms	Documents
l5 and l8 and L11 and (urethane or polyurethane)	3

Display Format:

-

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L12: Entry 1 of 3

File: USPT

Jan 22, 1991

US-PAT-NO: 4987156

DOCUMENT-IDENTIFIER: US 4987156 A

TITLE: Shock-absorbing polyurethane foam and production process thereof

DATE-ISSUED: January 22, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Komori; Ryuichi	Koga			JP
Ishii; Masashi	Wako			JP
Sakaguchi; Yoshio	Wako			JP
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ASSIGNEE-INFORMATION:

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APPL-NO: 07/ 361290 [PALM]

DATE FILED: June 5, 1989

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	63-137650	June 4, 1988
JP	1-125535	May 18, 1989

INT-CL: [05] C08G 18/14

US-CL-ISSUED: 521/99; 521/107, 521/123, 521/129, 521/130

US-CL-CURRENT: 521/99; 521/107, 521/123, 521/129, 521/130

FIELD-OF-SEARCH: 521/99, 521/107, 521/123, 521/129, 521/130

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

☐ **Search Selected** **Search ALL**

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>4565833</u>	January 1986	Buszard et al.	521/107
<input type="checkbox"/> <u>4746682</u>	May 1988	Green	521/107

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L12: Entry 1 of 3

File: USPT

Jan 22, 1991

DOCUMENT-IDENTIFIER: US 4987156 A

TITLE: Shock-absorbing polyurethane foam and production process thereofAbstract Text (1):

A shock-absorbing polyurethane foam is formed of a polyol component and a polyisocyanate component. The polyol component is a mixed polyol having an average hydroxyl number of 130-250 and composed at least of 20-70 parts by weight of a low-molecular polyol having a molecular weight of 300-500 and 80-30 parts by weight of a high-molecular polyol having a molecular weight of 1,500-8,000 per 100 parts by weight of the whole polyol component. The foam further contains 5-150 parts by weight of a plasticizer having a solidification point not higher than -20.degree. C. per 100 parts by weight of the whole polyol component. The foam can be produced by reacting the polyol component and polyisocyanate component in the presence of 5-150 parts by weight of the plasticizer per 100 parts by weight of the polyol component.

Brief Summary Text (3):

This invention relates to a shock-absorbing polyurethane foam having rather stable physical properties at varied temperatures and low resilience over a wide range of temperatures and useful as a shock-absorbing material, soundproofing material, cushioning material or the like. This invention is also concerned with a process for the production of the shock-absorbing polyurethane foam.

Brief Summary Text (5):

Preferred conventional shock-absorbing materials include (1) polyurethane foams obtained by using polyols, whose average molecular weights range from 700 to 1,000, as polyol components and having reduced resilience and enhanced cushioning properties; (2) acrylic rubber foams formed of copolymers of acrylic esters and acrylonitrile; (3) polyurethane foams obtained by adding asphalt to raw materials for polyurethane foams and then foaming the raw materials along with the asphalt into integral bodies (Japanese Patent Application Laid-Open No. 15433/1984); (4) polyurethane foams obtained by impregnating polyurethane foams with asphalt (Japanese Patent Application Laid-Open No. 152740/1986); (5) polyurethane foams formed of urethane elastomers (Japanese Patent Application Laid-Open No. 54000/1977); (6) polyurethane foams obtained by adding a great deal of oil to ring opening polymerization products of norbornene monomers and then curing the resulting mixtures ["Kogyo Zairyo (Industrial Materials)", 35(2), 1987]; etc.

Brief Summary Text (6):

The foams (1) and (2) have low resilience and exhibit excellent shock-absorbing properties at room temperature. When the temperature rises to about 30.degree. C. and further, their resilience increases so that their shock-absorbing properties are reduced. As the temperature drops, for example, to about 0.degree. C. or still further, they gradually become harder and show physical properties similar to hard polyurethane foams so that shock-absorbing properties cannot be expected any longer.

Brief Summary Text (7):

On the other hand, the polyurethane foams (3) and (4) have been imparted with shock-absorbing properties by asphalt which is a plastic material. When the temperature drops, asphalt, namely, the plastic material becomes harder so that the foams are rendered hard in toto and shock-absorbing properties are no longer expected. When the temperature rises, asphalt becomes softer or flowable. Accordingly, the polyurethane foams exhibit the inherent high resilience which they

had before the incorporation of asphalt, leading to a substantial reduction in their shock-absorbing properties. There is a further potential drawback that they may cause a smearing problem due to oozing-out of asphalt rendered flowable.

Brief Summary Text (8):

The polyurethane foams (5) and (6) are elastomers. They are hence accompanied by drawbacks such that they are heavy and moreover expensive.

Brief Summary Text (10):

The present inventors have carried out an extensive investigation with a view toward providing a solution to the above problems and drawbacks. As a result, it has been found that a polyurethane foam obtained by reacting a mixed polyol as a polyol component of the polyurethane foam with a polyisocyanate in the presence of a specific amount of a plasticizer having a solidification point not higher than -20.degree. C., said mixed polyol containing low-molecular and high-molecular polyols of specific molecular weights at a particular ratio and having an average hydroxyl number of 130-250, exhibits low resilience and has excellent shock-absorbing properties over a wide range of temperatures. It has also been found that upon production of such a polyurethane foam, use of a polyol having a high average hydroxyl number tends to give a closed-cell structure but when a polyol and a polyisocyanate are reacted using a tertiary amine salt of a specific structure as a catalyst, a flexible foam of an open-cell structure is obtained and especially, the presence of calcium carbonate facilitates the formation of a flexible foam of an open-cell structure. The present invention have been completed based on these findings.

Brief Summary Text (11):

In one aspect of this invention, there is thus provided a shock-absorbing polyurethane foam comprising a polyol component. The polyol component is a mixed polyol having an average hydroxyl number of 130-250 and composed at least of 20-70 parts by weight of a low-molecular polyol having a molecular weight of 300-500 and 80-30 parts by weight of a high-molecular polyol having a molecular weight of 1,500-8,000 per 100 parts by weight of the whole polyol component. The foam contains 5-150 parts by weight of a plasticizer having a solidification point not higher than -20.degree. C. per 100 parts by weight of the whole polyol component.

Brief Summary Text (12):

In another aspect of this invention, there is also provided a process for the production of a shock-absorbing polyurethane foam. The process comprises reacting a mixed polyol and a polyisocyanate in the presence of 5-150 parts by weight of a plasticizer having a solidification point not higher than -20.degree. C. per 100 parts by weight of the mixed polyol, said mixed polyol having an average hydroxyl number of 130-250 and composed at least of 20-70 parts by weight of a low-molecular polyol having a molecular weight of 300-500 and 80-30 parts by weight of a high-molecular polyol having a molecular weight of 1,500-8,000 per 100 parts by weight of the mixed polyol.

Brief Summary Text (13):

The polyurethane foam of this invention is soft and flexible and has low resilience. Moreover, these properties vary only a little with the temperature, so that it shows excellent shock-absorbing properties over a wide range of temperatures. It can therefore be used for applications in which conventional shock-absorbing materials are not usable satisfactorily, for example, athletic protectors, stadium fences, footwear, hospital beds, conveyors for weight-dependent or size-dependent fruit grading machines, toys, dolls, cushioning materials for automobiles, vibration dampers, sound-absorbing and soundproofing materials, and cushioning materials. Compared with the conventional shock-absorbing materials, the shock-absorbing material of this invention has broader applicability along with excellent shock-absorbing properties.

Brief Summary Text (14):

The process of this invention can produce the above-described excellent polyurethane foam without failure.

Detailed Description Text (2):

Preferably, the low-molecular and high-molecular polyols can be obtained by adding a single alkylene oxide such as ethylene oxide, propylene oxide or butylene oxide to a compound, which usually contains 2-8 active hydrogen atoms as an initiator, or by adding two or more of these alkylene oxides at random or in blocks to the compound to give molecular weights of 300-500 and 1,500-8,000, respectively. Illustrative examples of the compound containing two or more active hydrogen atoms as an initiator include water, ethylene glycol, propylene glycol, butylene glycol, hexylene glycol, diethylene glycol, dipropylene glycol, glycerin, trimethylolpropane, 1,2,6-hexanetriol, triethanolamine, pentaerythritol, ethylenediamine, tolylenediamine, diphenylmethanediamine, tetramethylolcyclohexane, methyl glucoside, 2,2,6,6-tetrakis-(hydroxymethyl)cyclohexanol, diethylenetriamine, sorbitol, mannitol, dulcitol, and sucrose. They may be used either singly or in combination.

Detailed Description Text (3):

If the average molecular weight of the low-molecular polyol is smaller than 300, the resultant polyurethane foam has high resilience although its physical properties change only a little with the temperature (i.e., its temperature sensitive characteristics are low). If it exceeds 500, the resultant polyurethane foam has low resilience and softness and flexibility at room temperature but becomes extremely hard at low temperatures, and its physical properties change to extremely large extents with the temperature (i.e., its temperature sensitive characteristics are extremely high). If the average molecular weight of the high-molecular polyol is smaller than 1,500, the resultant polyurethane foam has softness and flexibility at room temperature but when the temperature drops, it becomes harder. It therefore has high temperature sensitivity. Average molecular weights greater than 8,000 result in difficult control of foaming. It is necessary to contain at least these low-molecular and high-molecular polyols in amounts of 20-70 parts by weight and 80-30 parts by weight, respectively, per 100 parts of the whole polyol component. One or more polyols other than the above-described polyols may also be contained as polyol component or components. The total content of such other polyols may preferably be less than 50 parts by weight, especially 30 parts by weight or less, in other words, the low-molecular and high-molecular polyols may preferably amount in combination to at least 50 parts, especially at least 70 parts by weight of the mixed polyol. If the total content of the polyol or polyols other than the low-molecular and high-molecular polyols is 50 parts by weight or more per 100 parts by weight of the whole polyol component, in other words, if the total content of the low-molecular and high-molecular polyols is less than 50 parts by weight, or if the content of the low-molecular or high-molecular polyol exceeds the upper limit of the corresponding range described above even when the total content of the polyol or polyols other than the low-molecular and high-molecular polyols is less than 50 parts by weight per 100 parts by weight of the whole polyol component, it is difficult to obtain a stable foam, or even if the resultant foam has flexibility at room temperature, it becomes harder at low temperatures or it has high resilience and small shock-absorbing properties on the contrary. If the average hydroxyl number of the mixed polyol containing the low-molecular and high-molecular polyols is smaller than 130, the resulting polyurethane foam has low temperature sensitivity but has high resilience and inferior shock-absorbing ability. If the average hydroxyl number of the mixed polyol exceeds 250, the resulting polyurethane foam has high temperature sensitivity so that it has shock-absorbing properties at room temperature but becomes very hard and has extremely inferior shock-absorbing properties when the temperature drops.

Detailed Description Text (4):

The polyurethane foam of this invention contains a plasticizer having a solidification point not higher than -20.degree. C., preferably not higher than -50.degree. C. in an amount of 5-150 parts by weight, preferably 5-50 parts by weight per 100 parts by weight of the whole polyol component. As such a plasticizer, it is possible to use, for example, a dibasic acid ester such as dioctyl adipate or dibutyl maleate; an alkyl phosphate such as trioctyl phosphate or tributyl phosphate; a halogenated alkyl phosphate such as trichloroethyl phosphate; an aromatic phosphoric ester such as cresyl diphenyl phosphate; or a phosphoric ester such as tributoxyethyl phosphate. These plasticizers may be used either singly or in combination. The amount of the plasticizer to be added may be suitably chosen from a range of 5-150 parts by weight depending on the composition of the polyol component,

i.e., the mixing ratio of the low-molecular polyol to the high-molecular polyol and the indentation load deflection (ILD) desired for the resulting foam. If the content of the plasticizer is less than 5 parts by weight, the resultant polyurethane does not have sufficient softness and flexibility and is hence inferior in practical utility. On the other hand, any plasticizer contents higher than 150 parts by weight inhibit the reaction between the polyol and polyisocyanate, thereby making it difficult to obtain a satisfactory polyurethane foam. The plasticizer may be added, for example, to the polyol in advance upon reaction of the polyol and polyisocyanate.

Detailed Description Text (5):

The polyurethane foam according to this invention can be obtained, for example, by reacting the above polyol component with a polyisocyanate in the presence of the above plasticizer, foaming agent and catalyst. No particular limitation is imposed on the polyisocyanate so long as it is generally used for the production of general polyurethane foams. It is possible to use, for example, the 2,4-isomer or 2,6-isomer of tolylene diisocyanate or a mixture thereof, diphenylmethane diisocyanate, hexamethylene diisocyanate, naphthalene diisocyanate, or the like. Although two or more of these polyisocyanates may also be used in combination, it is preferable from the standpoint of control of the foaming to use a 80:20 to 65:35 mixture (by weight) of the 2,4-isomer and 2,6-isomer of tolylene diisocyanate. No particular limitation is imposed on the reaction ratio of the mixed polyol to the polyisocyanate. It is however preferred to react them at an NCO/OH ratio of 0.90-1.15 in view of the shape restoration characteristics of the resulting foam after compression and the stability at the time of foaming.

Detailed Description Text (6):

Exemplary foaming agents usable for the production of the foam of this invention include water and low-boiling halogenated hydrocarbons such as Freon-11 (trade name) and methylene chloride. They may be used either singly or in combination. As a catalyst, it is possible to use any one of amine and similar catalysts which are employed for the production of general urethane foams. Although not applicable to all instances, foams having a closed-cell structure tend to occur where a plasticizer is used in a small amount and a mixed polyol having a higher average hydroxyl number is employed. In such cases, it is preferable to use a catalyst containing at least a tertiary amine salt represented by the following formula (a): ##STR1## wherein n is an integer of at least 0. Use of such a catalyst containing such a tertiary amine salt allows the polymerization to proceed in a well-balanced manner and hence facilitates the control of the reaction, whereby a flexible foam of an open-cell structure can be obtained with ease. The amount of the tertiary amine salt to be used varies depending on the composition of the mixed polyol and may be determined as desired depending on the composition. In addition, combined use of calcium carbonate can readily provide a flexible foam of an open-cell structure. Addition of calcium carbonate in a large amount however involves a potential problem that certain physical properties of the resulting foam may be adversely affected. It is therefore preferable to limit the amount of calcium carbonate within about 1-20 parts by weight per 100 parts by weight of the whole polyol component.

Detailed Description Text (8):

Upon production of the foam of this invention, it is also possible to add one or more flame retardants, such as trixylenyl phosphate, triphenyl phosphate, xylenyl diphenyl phosphate, octyl diphenyl phosphate, tricresyl phosphate, trichloropropyl phosphate, tris(tribromophenyl) phosphate, hexabromobenzene and/or chlorinated paraffin; one or more fillers, such as hydrogenated castor oil, starch, barium sulfate, aluminum hydroxide and/or carbon black; one more pigments; etc. as needed.

Detailed Description Text (12):

Polyurethane foams were each obtained by adding the corresponding plasticizer, water (foaming agent), catalyst, foam stabilizer, etc. shown in Table 1 to the corresponding polyol also given in the same table and then reacting the polyol with a 65:35 (by weight) mixed polyisocyanate of the 2,4- and 2,6-isomers of tolylene diisocyanate at the corresponding NCO/OH index depicted in the same table. Physical properties of the foams thus obtained are summarized in Table 2. The foams obtained in Examples 12 and 13 partly contained a closed-cell structure. As examples showing the characteristic features of the present invention, the indentation load

Detailed Description Paragraph Table (1):

Example	1	2	3	4	5	6	7	8	9	10	11	12	13
---------	---	---	---	---	---	---	---	---	---	----	----	----	----

															Glycerin											
Polyol-1.sup.1																										
Polyol-2.sup.2															Polyol-3.sup.3											
36.4			36.4	36.4	36.4	36.4	Polyol-4.sup.4	31	35	37		46		54												
50	50	Polyol-5.sup.5				30	20					Polyol-6.sup.6														
Polyol-7.sup.7															54											
Polyol-8.sup.8	69		63.6	70	80	63.6	63.6	50	63.6	50	Polyol-9.sup.9															
65							Polyol-10.sup.10		63				46													
Average hydroxyl															169	175	177	240	174	239	135	240	243	240	240	240
number of polyol TBXP.sup.11															8									TBP.sup.12		
7						TOP.sup.13	8		25	25	25	10	150	25	25	25	25									
DOA.sup.14																				CDP.sup.15					50	
TDCP.sup.16																							Water	1.5	1.5	1.5
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	Catalyst A.sup.17	0.8	0.8	0.8	1.0	0.3										
4.0		1.0	1.5	Catalyst B.sup.18	1.5	1.5	1.2	4.0	3.0	3.0	3.0	3.0	3.0	3.0	8.5											
7.0	Catalyst C.sup.19						0.1					Catalyst D.sup.20														
1.0	1.0	1.5	1.5	1.5		Calcium carbonate						5														
10	10		Foam stabilizer A.sup.21	1.5	1.5	1.5	1.0	1.0	0.2	0.6	0.3	1.0	0.2	0.2	1.0											
1.0	Foam stabilizer B.sup.22					1.0	1.0	1.0	1.0																	
100	100	100	95	100	95	100	95	95	95	95	95															

Comparative Example	1	2	3	4	5	6	7	8
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[illegible]

1. A shock-absorbing polyurethane foam comprising a polyol component and a polyisocyanate component, characterized in that the polyol component is a mixed polyol having an average hydroxyl number of 130-250 and composed at least of 20-70 parts by weight of a low-molecular polyol having a molecular weight of 300-500 and 80-30 parts by weight of a high-molecular polyol having a molecular weight of 1,500-8,000 per 100 parts by weight of the whole polyol component; and the foam contains 5-150 parts by weight of a plasticizer having a solidification point not higher than -20.degree. C. per 100 parts by weight of the whole polyol component.

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molecular weight of 300-500 and 80-30 parts by weight of a high-molecular polyol having a molecular weight of 1,500-8,000 per 100 parts by weight of the mixed polyol.

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flame retardant

L7: Entry 26 of 78

File: USPT

Feb 17, 1998

US-PAT-NO: 5719199

DOCUMENT-IDENTIFIER: US 5719199 A

TITLE: Flame retardant flexible foam

DATE-ISSUED: February 17, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wallace; William R.	Manchester			GB3
Baumforth; Ronald J.	Bollington			GB3

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Kay-Metzeler Limited	Manchester			GB3	03

APPL-NO: 08/ 820941 [PALM]

DATE FILED: March 19, 1997

PARENT-CASE:

This is a division of application Ser. No. 08/627,002, filed Apr. 3, 1996, now U.S. Pat. No. 5,650,448.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
GB	9506836	April 3, 1995

INT-CL: [06] C08 J 9/10

US-CL-ISSUED: 521/82; 521/79, 521/81, 521/94, 521/143, 521/149, 521/907, 523/179, 523/218, 523/219

US-CL-CURRENT: 521/82; 521/143, 521/149, 521/79, 521/81, 521/907, 521/94, 523/179, 523/218, 523/219

FIELD-OF-SEARCH: 521/79, 521/82, 521/81, 521/94, 521/143, 521/149, 521/907, 523/218, 523/219, 523/179

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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L7: Entry 26 of 78

File: USPT

Feb 17, 1998

DOCUMENT-IDENTIFIER: US 5719199 A
TITLE: Flame retardant flexible foam

Brief Summary Text (6):

The normal practice throughout the world is for an inflatable life jacket to be stored underneath the passenger seat, for use in emergency should the aircraft be forced to land on water. There are, however, exceptions to this--notably in the USA and Canada, where the regulations allow for the use of an inflatable life jacket and/or the need for the seat cushion to be sufficiently buoyant to support the passenger in water. Since aircraft seat cushions are predominantly made from flexible polyurethane foams which are open celled, and hence absorb water, this is currently achieved by incorporating a closed cell foam, e.g. polyethylene, into the seat construction. The seat cushion is held in place by the use of velcro type fastenings and this can be readily removed from the seat frame when required, as a buoyancy aid.

Brief Summary Text (8):

Relatively recently, flexible polyurethane foams have been introduced which have been provided with a fire resistance sufficiently high to meet the above oil burner test. This has been achieved by post-treatment of the foam or incorporation into it of a solid flame retardant such as expandable graphite, so that the need for a fire barrier layer was negated. However, for cushions containing a buoyancy foam it was still necessary to block separately, with a fire barrier layer, the buoyancy foam; otherwise the above oil burner test could still not be satisfied.

Brief Summary Text (10):

U.S. Pat. No. 3,574,644 discloses the incorporation into many materials of expandable graphite for conferring upon them flame retardancy. Examples are greases, petroleum oils, asphalts, rubbers, wood, film forming agents such as latexes, paints etc, and synthetic and natural polymeric material such as cellulose, polystyrene, polyethylene, polyurethane etc. The only foam material mentioned is a rigid polyurethane foam. However, such foams are not flexible and the closed cells of such a foam are easily fractured upon compression, thus rendering the material non-buoyant. For this reason, such foams are of no practical value for providing buoyancy in seating applications, where such compressive forces will of course be experienced.

Brief Summary Text (11):

GB-A-2168706 discloses the incorporation into flexible polyurethane foams of expandable graphite, while U.S. Pat. No. 5,169,876 reports an improvement in such a foam by ensuring that the flakes of the expandable graphite have a size in the order of magnitude of resultant foam cell walls. However, such flexible foams are of an open cell structure and cannot serve as a buoyancy aid.

Brief Summary Text (48):

(ii) they can be used in combination with graphite containing polyurethane flexible open celled foam without the need for any fire blocking layer such as a barrier fabric;

Brief Summary Text (50):

(iv) the foam may be more flexible and softer than standard polyethylene floatation foams currently in use; this makes it more comfortable in service. In particular, where the cushion contains an overlaying polyurethane foam, this does not bottom out

onto a hard foam layer. This therefore allows a greater degree of flexibility in cushion design, when for example, it is necessary to incorporate the floatation foam as wedges at the sides of the seating area. The foam in accordance with the invention does not detract from the seating comfort if situated in the central area of the cushion.

Detailed Description Text (15):

(a) the poly(ethylene-vinyl acetate) (EVA)/expanded graphite foam of Example 10 (25%) bonded to a 55 kg/m³ density aircraft grade expandable graphite-containing polyurethane (PU) foam (MP55) (75%);

Detailed Description Paragraph Table (1):

TABLE A

Control Control Example Example Example INGREDIENTS A B 1 2 3

										Polymer					
(a1)	100.0	100.0	100.0	100.0	100.0	Primary Blowing	(b1)	10.0	14.0	14.0	14.0	14.0			
Agent	Secondary	Blowing	(b2)	2.0	2.0	2.0	2.0	2.0	Agent	Lubricant	(c)	2.0	2.0	2.0	2.0
2.0	Expandable	Graphite	--	--	22.50	28.0	18.0	Curing	Agent	(d)	1.0	1.0	1.5	1.5	1.5
Co-Agent	(e)	--	--	0.5	0.5	0.5	Flame Retardant	(f)	--	20	--	--	Flame Retardant	(g)	5.0

Notes to Table A. (a1) An EVA available from Exxon Chemicals as UL00218. (b1) A blowing agent which is an azodicarbonamide available from Bayer Chemicals as Porofoor KA9149, and available from West & Senior as Fascom AZ4ED. (b2) A secondary blowing agent which is 4,4oxybis (benzenesulphonyl hydrazide) available commercially from Uniroyal as Celogen T0. (c) Zinc Stearate available from Durham Chemicals. (d) Bis(tert.butyl peroxy isopropyl) benzene, a peroxide curing agent commercially available from Akzo Chemie as Perkadox 14-40. (e) ATM16* commercially available from Ancomer (*results similar to the above were also obtained using ATM14, also commercially available from Ancomer). (f) Cereclor S52, a chlorinated paraffin commercially available from ICI. (g) A phosphorus/chlorine flame retardant commercially available from Albright & Wilson as Amgard V6.

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L7: Entry 17 of 78

File: USPT

Jul 24, 2001

US-PAT-NO: 6265457

DOCUMENT-IDENTIFIER: US 6265457 B1

chlor. paraffin as extenders

TITLE: Isocyanate-based polymer foam and process for production thereof

DATE-ISSUED: July 24, 2001

INVENTOR-INFORMATION:

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NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
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DATE FILED: December 11, 1998

INT-CL: [07] C08 G 18/14

US-CL-ISSUED: 521/155; 521/134, 521/137, 521/170, 521/174

US-CL-CURRENT: 521/155; 521/134, 521/137, 521/170, 521/174

FIELD-OF-SEARCH: 521/134, 521/137, 521/170, 521/174, 521/155

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>3558531</u>	January 1971	Salyer et al.	
<input type="checkbox"/>	<u>3600340</u>	August 1971	Patton, Jr. et al.	
<input type="checkbox"/>	<u>3694385</u>	September 1972	Salyer et al.	521/137
<input type="checkbox"/>	<u>4061701</u>	December 1977	Stastny et al.	264/51
<input type="checkbox"/>	<u>5086084</u>	February 1992	Michaelson	521/137
<input type="checkbox"/>	<u>5312847</u>	May 1994	Vos	521/137

FOREIGN PATENT DOCUMENTS

Typically, the amination step replaces the majority but not all of the hydroxyl groups of the polyol.

Detailed Description Text (34):

In a preferred embodiment, Q may also represent a polyurethane radical having a valence of i. In this case Q(NCO), is a compound which is commonly referred to in the art as a prepolymer. Generally, a prepolymer may be prepared by reacting a stoichiometric excess of an isocyanate compound (as discussed hereinabove) with a polyhydroxyl-containing material or polyol (as discussed hereinabove). In this embodiment, the isocyanate may be, for example, used in proportions of from about 30 percent to about 200 percent stoichiometric excess with respect to the proportion of hydroxyl in the polyol. The prepolymer may then be reacted with a polyol to produce a polyurethane foam or an amine to produce a polyurea-modified polyurethane. As will be demonstrated below, if the polyol used to produce the prepolymer is the chain extending agent (as discussed hereinbelow), it is still necessary to utilize the second polyol in the polyol mixture. Further, the second polyol in the polyol mixture described above should be used in the polyol mixture regardless of whether a similar polyol is used to produce the prepolymer to ensure that a polyurethane foam having an integral skin is produced. Thus, in the context of the present process, a prepolymer should be considered a subset of useful isocyanates and the use thereof does not replace the need to use the polyol mixture discussed hereinabove. A non-limiting example of a prepolymer useful in the present process is commercially available from Bayer Corporation under the tradename Mondur.TM. PF.

Detailed Description Text (44):

The reaction mixture used in the first step of the present process further comprises a blowing agent. The preferred blowing agent is aqueous blowing agent. As is known in the art, aqueous blowing agents, such as water, can be used as a reactive blowing agent in the production of isocyanate-based polymer foams. Specifically, water reacts with the isocyanate forming carbon dioxide which acts as the effective blowing agent in the final foamed polymer product. A key advantage of the present process is the ability to produce a slabstock polyurethane foam using an amount of water which, in conventional practice, could result in a very high exotherm in the foam after production.

Detailed Description Text (47):

As will be clearly understood by those of skill in the art, it is contemplated that conventional additives in the polyurethane foam art can be used in the present process. Non-limiting examples of such additives include: filler materials (e.g., materials which have an enthalpy of endothermic transition less than 50 J/g), surfactants (e.g., organo-silicone compounds available under the tradename L-540 Union Carbide), cell openers (e.g., silicone oils), extenders (e.g., halogenated paraffins commercially available as Cereclor S45), cross-linkers (e.g., low molecular weight reactive hydrogen-containing compositions), pigments/dyes, flame retardants (e.g., halogenated organo-phosphoric acid compounds), inhibitors (e.g., weak acids), nucleating agents (e.g., diazo compounds), anti-oxidants, UV stabilizers (e.g., hydroxybenzotriazoles, zinc dibutyl thiocarbamate, 2,6-ditertiary butylcatechol, hydroxybenzophenones, hindered amines and mixtures thereof), plasticizers (e.g., sulfonated aromatic compounds), biocides, antistatic agents (e.g., ionizable metal salts, carboxylic acid salts, phosphate esters and mixtures thereof) and mixtures thereof. The amounts of these additives conventionally used is within the purview of a person skilled in the art--see, for example, Chapter 2 of FLEXIBLE FOAM FUNDAMENTALS, Herrington et al. (1991) and the references cited therein, the contents of which are incorporated herein by reference.

Detailed Description Text (49):

Once the active hydrogen-containing compound, isocyanate, blowing agent, chain extending agent and catalyst have been contacted and, ideally, mixed uniformly, a reaction mixture is formed. This reaction mixture is then expanded to produce the present isocyanate-based polyurethane foam. As will be apparent to those of skill in the art, the process of the present invention is useful in the production of slabstock foam, molded articles and the like. The manner by which expansion of the reaction mixture is effected will be dictated by the type of foam being produced.

CLAIMS:

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L9: Entry 1 of 1

File: USPT

Oct 6, 1987

US-PAT-NO: 4698369

DOCUMENT-IDENTIFIER: US 4698369 A

TITLE: Flexible, flame-retardant polyurethane foams

DATE-ISSUED: October 6, 1987

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Dunlop Limited a British Company				GB	03

APPL-NO: 06/ 875705 [PALM]

DATE FILED: June 18, 1986

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US-CL-CURRENT: 521/99; 521/103, 521/106, 521/123, 521/132, 521/906

FIELD-OF-SEARCH: 521/99, 521/103, 521/106, 521/123, 521/132, 521/906

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

☐ **Search Selected**☐ **Search ALL**

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>3574644</u>	April 1971	Olstowski et al.	106/15
<input type="checkbox"/>	<u>4390656</u>	June 1983	Weise et al.	524/493
<input type="checkbox"/>	<u>4438221</u>	March 1984	Fracalossi et al.	521/99

FOREIGN PATENT DOCUMENTS

graphite (g) Available from I.C.I. Limited as CERECLOR S52 (CERECLOR is a Registered Trade Mark) (h) ~~A modified MDI, available from I.C.I. Limited under the reference VM 25.~~

chlor. paraffin - see 5,719,199

Detailed Description Paragraph Table (5):

TABLE D _____ Ingredient (see notes EXAMPLE below)
 8 _____ Polymeric polyol (a) 100 Cross-linking agent (b) 6 Water 8 Amine catalyst (c) 1.2 Tertiary amine catalyst (d) 0.2 Surfactant (e) 0.9 Graphite (f) 20 Chlorine/phosphorus compound (g) 10 Dibutyl tin dilaurate 0.03 Polyisocyanate (h) 41.5 _____ Notes to TABLE D (a) Polyol 7963 (See TABLE C) (b) Available from Lankro Chemicals Limited under the reference A260 (c) DABCO 33 LV (see TABLE A) (d) A1 (see TABLE C) (e) B8629 (see TABLE C) (f) Fine grade expandable graphite (g) TOLGARD V6 (see TABLE B) (h) I 13-17 (see TABLE A)

Detailed Description Paragraph Table (6):

TABLE E _____ Ingredient Examples 9 and 10
 _____ Polymeric polyol (a) 50 Polymeric polyol (b) 50 Water 3.2 Amine catalyst (c) 3 Tertiary Amine Catalyst (d) 0.2 Surfactant (e) 0.6 Expandable graphite 43.7 Sodium tetra borate decahydrate 5 Polyisocyanate (f) 75 _____ Notes to Table E (a) A polyoxypropylene polyoxyethylene triol of approximate molecular weight 6000, having a high proportion of terminal primary hydroxyl groups and available from Bayer AG under the reference 7963. (b) Available from B P Chemical Limited under the reference U1315 (c) Triethylene diamine, available from Air Products Limited as DABCO 33L (d) Available from Union Carbide under the reference NiAX A1 (e) Polyalkylene oxide polydimethyl siloxane silicone available under the reference B4113 (f) Modified diphenyl methane diisocyanate available from ICI under reference VM25.

CLAIMS:

1. A method for the production of a flexible, flame-retardant polyurethane foam by reacting in a foam-forming reaction mixture a polymeric polyol, an organic polyisocyanate and an effective amount of expandable graphite, wherein said expandable graphite contains one or more exfoliating agents.

8. A flexible, flame-retardant polyurethane foam, said foam being the reaction product under foam-forming conditions of a polymeric polyol, an organic polyisocyanate and an effective amount of expandable graphite, said expandable graphite containing one or more exfoliating agents.